AMENDED CLAIMS

[received by the International Bureau on 06 July 2005 (06.07.05); original claims 19-23 amended; remaining claims unchanged (2 pages)]

12. The method of claim 9 wherein the semiconductor material comprises SiGeSn.

13. The method of claim 9 wherein the semiconductor material comprises SnGe.

14. A method for depositing a doped epitaxial Ge-Sn layer on a substrate in a chemical vapor deposition reaction chamber, the method comprising:

introducing into the chamber a gaseous precursor comprising SnD_4 mixed in H_2 under conditions whereby the epitaxial Ge-Sn layer is formed on the substrate; and

introducing into the chamber a gaseous precursor having the formula $E(GeH_3)_3$, wherein E is selected from the group consisting of arsenic (As), antimony (Sb) and phosphorus (P).

15. The method of claim 14 wherein the gaseous precursor is introduced at a temperature in a range of about 250°C to about 350°C.

16. The method of claim 14 wherein the substrate comprises silicon.

17. The method of claim 14 wherein the silicon comprises Si(100).

18. The method of claim 14 wherein the Ge-Sn layer comprises Sn_xGe_{1-x} and x is in a range from about .02 to about .20.

19. A method for forming a Group IV semiconductor film, the method comprising

forming the Group IV semiconductor film by a chemical vapor deposition method, wherein the Group IV semiconductor film is doped with impurities comprising an element E at a concentration ranging from about 10^{21} atoms/cm^3 to about several percent using a precursor having the formula $E(GeH_3)_3$ wherein E is selected from the group consisting of arsenic (As), phosporous (P) and antimony (Sb).

20. A method for forming a Group IV semiconductor film, the method comprising:

forming the Group IV semiconductor film by a chemical vapor deposition method; and

while forming the Group IV semiconductor film, doping the film with impurities comprising an element E at a concentration ranging from about 10^{21} atoms/cm^3 to about 3 at. % using a precursor having the formula $E(GeH_3)_3$ wherein E is selected from the group consisting of arsenic (As), antimony (Sb)

and phosphorus (P).

21. The method for forming a Group IV semiconductor film according to claim 20, wherein arsenic (As), antimony (Sb) and phosphorus (P) are added to the Group IV semiconductor film by diffusion methods.

22. The method for forming a Group IV semiconductor film according to claim 20, wherein the doping step comprises introducing into a reaction chamber the precursor having the formula $E(GeH_3)_3$ and a reactant comprising SnD_4, GeH_4 or Ge_2H_6.

23. A method of preparing $(E)H_x(GeH_3)_{3-x}$, where x= 1 or 2 and E is selected from the group consisting of P, As, Sb, the method comprising reacting inorganic or organometallic compounds of the E element with an alkali germyl or a halogenated germane.

24. The method of preparing $(E)H_x(GeH_3)_{3-x}$ according to claim 23 wherein the alkali germyl comprises $KGeH_3$.

25. The method of preparing $(E)H_x(GeH_3)_{3-x}$ according to claim 23 wherein the halogenated germane comprises $BrGeH_3$.

STATEMENT UNDER ARTICLE 19(1)

Pursuant to Article 19(1) of the Patent Cooperation Treaty and Rule 46.4 of the Regulations under the PCT, Applicant provides the following remarks regarding the claim amendments submitted pursuant to Article 19 in the captioned application.

In the Written Opinion of the International Search Authority, dated 6 May, 2005 (the "Written Opinion"), the Authorized Officer has pointed out certain typographical errors in claims 19, 20, 21, 22 and 23. Applicants have amended these claims as follows to correct the typographical errors:

In claim 19, line 2, —film— is inserted after "semiconductor".

In claim 20, a period is added at the end of the claim.

In claim 21, line 2, "t" is deleted.

In claim 22, lines 3-4, "SnD_4, GeH_4, Ge_2H_6" has been replaced with — and a reactant comprising SnD_4, GeH_4 or Ge_2H_6—.

In claim 23, line 3, the misspelling of "orhanometallic" has been corrected to — organometallic—.

These amendments are not intended to and do not narrow the scope of the amended claims. Rather, they only correct typographical errors.

In the Written Opinion, the Authorized Officer has stated that claims 19-22 lack novelty under PCT Article 33(2) as being anticipated by Murthy et al. and Sugawara. Applicant has amended claims 19 and 20, rendering the Authorized Officer's statement moot.

Claim 19 has been amended to recite that the Group IV semiconductor film is doped

Claim 19 has been amended to recite that the Group IV semiconductor film is doped with impurities "comprising an element E" at a concentration ranging from about 10^{21} atoms/cm^3 to about several percent "using a precursor having the formula $E(GeH_3)_3$ wherein E is selected from the group consisting of arsenic (As), phosporous (P) and antimony (Sb)."

Applicant respectfully submits that neither Murthy et al. nor Sugawara teach or suggest a method that includes the steps of amended claim 19. Applicant respectfully submits, therefore, that neither Murthy et al. nor Sugawara anticipate amended claim 19.

Claim 20 has been amended to recite that the inpurities comprise "an element E" and that the doping is done "using a precursor having the formula $E(GeH_3)_3$ wherein E is selected from the group consisting of arsenic (As), antimony (Sb) and phosphorus (P)."

Applicant respectfully submits that neither Murthy et al. nor Sugawara teach or suggest a method that includes the steps of amended claim 20. Applicant respectfully submits, therefore, that neither Murthy et al. nor Sugawara anticipate amended claim 20.

Each of claims 21 and 22 depends from and includes all of the limitations of amended claim 20. Claim 22 also has been amended to state, consistent with amended claim 20, that the doping step comprises introducing into a reaction chamber the "the precursor having the formula $E(GeH_3)_3$." Applicant respectfully submits, therefore, that neither Murthy et al. nor Sugawara anticipate claims 21 and 22.